



SKILLSHEET 7.1

Recognising linear relationships

Linear functions can be recognised in a number of ways.

1. The graph of a linear function is a straight line.
2. The equation of a linear function can be expressed in the form $y = mx + c$, where m is a number that represents the gradient of the line and c is the y -intercept.

If an equation can be transposed (or rearranged) into the $y = mx + c$ form, then it shows that the equation represents a linear function. Notice that the power of both y and x is one.

WORKED EXAMPLE 1

Does $2x + y = 5$ represent a linear function?

THINK

$$\begin{aligned} 2x + y &= 5 \\ y &= 5 - 2x && \text{(Subtract } 2x \text{ from both sides.)} \\ y &= -2x + 5 && \text{(Reorder the right side of the equation.)} \end{aligned}$$

WRITE

This is of the form $y = mx + c$, where $m = -2$ and $c = 5$, so the equation does represent a linear function.

WORKED EXAMPLE 2

Does $y = \frac{5}{x}$ represent a linear function?

THINK

$$\begin{aligned} y &= \frac{5}{x} \\ xy &= 5 && \text{(Multiply both sides by } x\text{.)} \end{aligned}$$

WRITE

This equation cannot be rearranged into the form $y = mx + c$, so does not represent a linear function.

Try these

Decide whether each of the following equations represents a linear function. Give reasons for your answer.

- | | |
|--------------------------|---------------------------|
| 1 $7 + y = x$ | 2 $y^2 = x + 5$ |
| 3 $4x + 2y = 9$ | 4 $-3x = y - 2$ |
| 5 $xy = 3$ | 6 $x^2 + 2y = x + 4$ |
| 7 $15 = 3(x + y)$ | 8 $4x^2 + 4y^2 = 64$ |
| 9 $\sqrt{y + 1}$ | 10 $7x - 4y - 35 = 0$ |
| 11 $y = 6$ | 12 $\frac{2y}{x} = x + 6$ |
| 13 $\frac{y}{8} + 9 = x$ | 14 $x = 2$ |
| 15 $x = -\frac{1}{y}$ | 16 $\frac{y}{x} = -10$ |

SKILLSHEET — ANSWERS

SKILLSHEET 7.1

Recognising linear relationships

- | | |
|--------------------------|--------------------------|
| 1 Linear function | 2 Not a linear function |
| 3 Linear function | 4 Linear function |
| 5 Not a linear function | 6 Not a linear function |
| 7 Linear function | 8 Not a linear function |
| 9 Not a linear function | 10 Linear function |
| 11 Linear function | 12 Not a linear function |
| 13 Linear function | 14 Linear function |
| 15 Not a linear function | 16 Linear function |